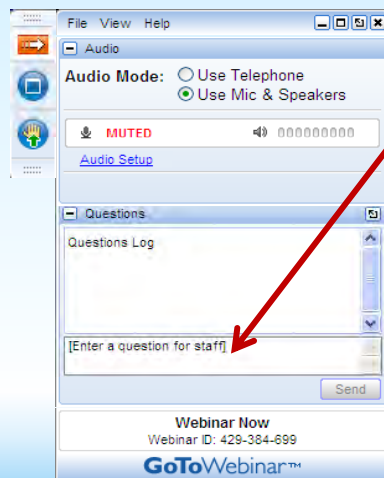


# Using EPA's Energy Use Assessment Tool

May 31, 2012  
Office of Ground Water and Drinking Water (OGWDW)

## Questions & Answers



You can submit questions/comments any time during the presentation

Just use the question and answer pane that is located on your screen

The speakers will address as many questions as possible

## Disclaimer

*This guidance does not confer legal rights or impose legal obligations upon any member of the public. While EPA has made every effort to ensure the accuracy of the discussion in this presentation, the obligations of the regulated community are determined by statutes, regulations, or other legally binding requirements. In the event of a conflict between the discussion in this presentation and any statute or regulation, this presentation would not be controlling.*



## Today's Panel



Office of Ground Water and Drinking Water

Sonia Brubaker

Mike Finn



Kim Baslock

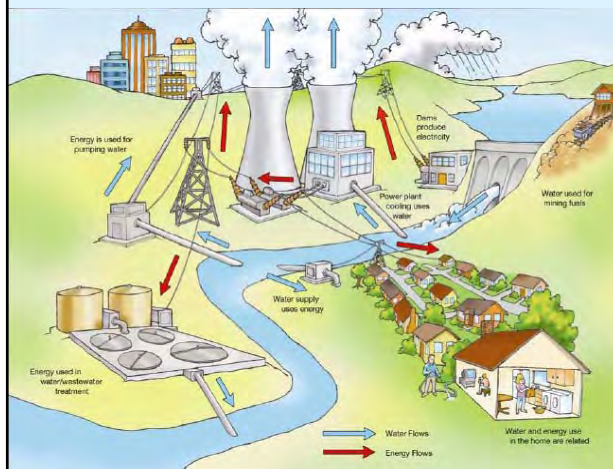


## Agenda

- **Why is energy use at water and wastewater systems important?**
- What are the steps in an energy use assessment?
- How can the Energy Use Assessment Tool be used?
- What are next steps?



## Energy/Water Nexus



- **Nexus between Water & Energy**

- Producing energy needs water
  - Extracting, treating & distributing water needs energy
- **Conserving one reduces both**



## Energy Use and Water Utilities

**Water and Wastewater treatment represents about 3% of the nation's energy consumption**

- About \$4 billion is spent annually for energy costs to run drinking water and wastewater utilities
- Equivalent to approximately 56 billion kilowatt hours (kWh)
- Equates to adding approximately 45 million tons of greenhouse gas to the atmosphere

**Energy represents the largest controllable cost of providing water or wastewater services to the public**

- Over 16,000 municipal treatment plants in the US and over 50,000 community water systems
- For wastewater, energy represents 25-30% of the total plant O&M
- As energy costs rise, operating costs rise



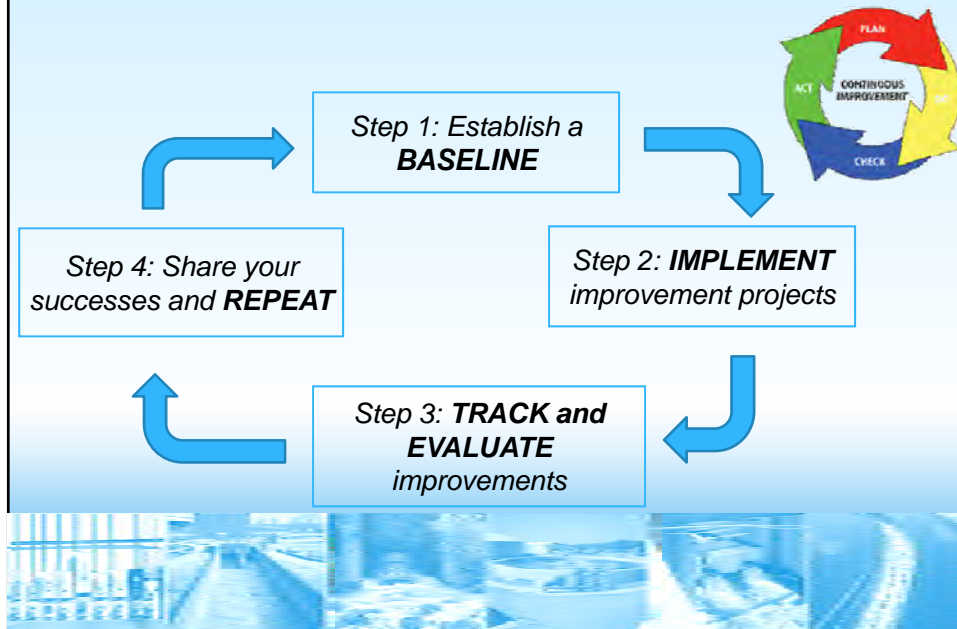
## Why Focus on Management?

**Energy issues are here to stay and will only get more serious—no quick fixes!**

- Individual projects and technologies are fine, but something is needed to pull it all together (**a management system**)
- Systematic management will ensure **continuing** focus on energy efficiency
  - Reduce operating costs
  - Financial savings can be reinvested back into system
  - Less pressure on freshwater resources
  - Less strain on current energy grid
- The **Plan-Do-Check-Act** management systems approach has worked in many different sectors



## Major Steps of Improving Efficiency



## What is an Energy Use Assessment?

*A means of assessing your system's baseline energy consumption and costs, in order to identify areas for improved energy efficiency and operational savings.*





# Getting Started in Preparing an Energy Use Assessment

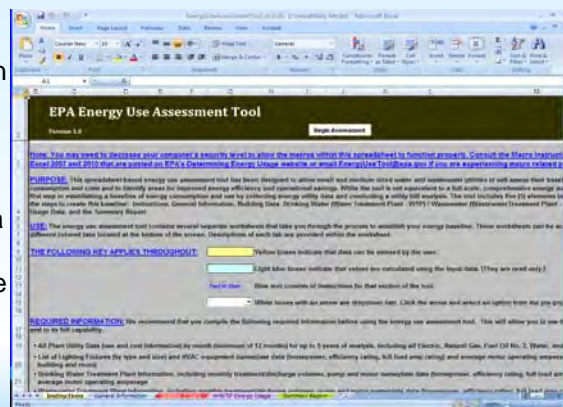
## Identified Need/Resource Gap

- **Utilities getting stuck on Step 1: Baseline**
  - High cost of hiring third-party energy auditors (\$8-25K depending on system size)
  - Lack of internal energy expertise
- **Utilities getting stuck on Step 2: Implementation**
  - Not able to appropriately identify or prioritize projects (or operational modifications)
  - Not able to compare energy impacts of current technologies vs. other or new technologies
  - Systems unfamiliar with funding opportunities for energy efficiency



## EPA's Energy Use Assessment Tool can Help!

- Free of charge, downloadable tool based in Excel that can be used by small and medium water and wastewater systems
- Allows a utility to conduct a utility bill and equipment analysis to assess baseline energy use and costs
- Use prior to a full-scale energy audit



[http://water.epa.gov/infrastructure/sustain/energy\\_use.cfm](http://water.epa.gov/infrastructure/sustain/energy_use.cfm)

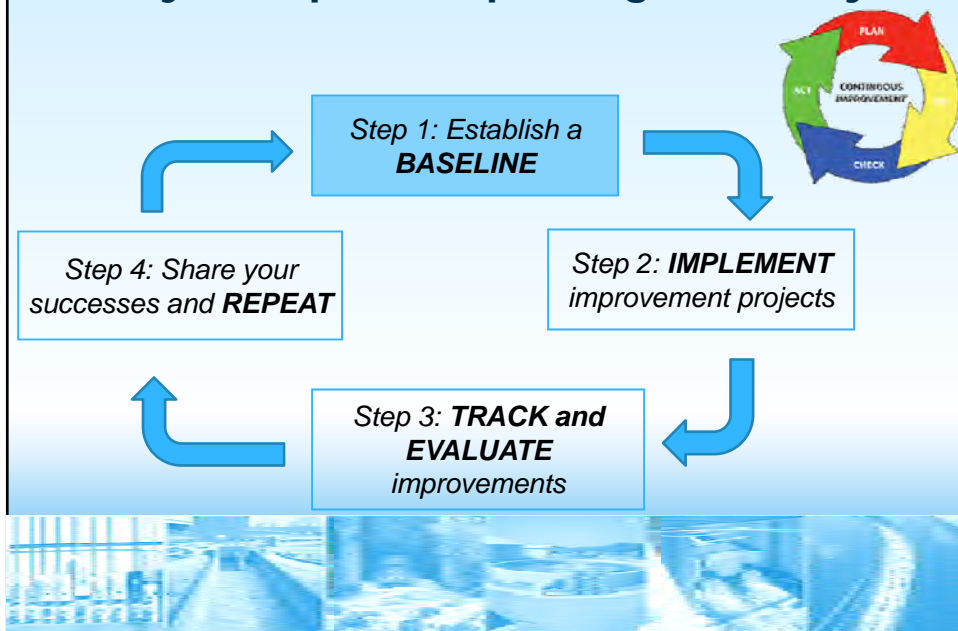


## Agenda

- Why is energy use at water and wastewater systems important?
- **What are the steps in an energy use assessment?**
- How can the Energy Use Assessment Tool be used?
- What are next steps?



## Major Steps of Improving Efficiency



## Preparing an Energy Use Assessment

Before assessing any energy use improvements you must first:

### **Establish a Baseline**

Your individual utility baseline is an orderly and clear way to document what your energy usage and costs are and which processes and pieces of equipment are consuming that energy.



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## Preparing an Energy Use Assessment: Establish a Baseline

- To establish a baseline you will collect utility bills and the operating data of process equipment, HVAC equipment and lighting.
- The more information you can collect the better your baseline is, but do not get hung up “completing” the baseline because you do not have EVERYTHING. What is a good amount to cover?
  - Two years of utility bills are a good start for an initial baseline.
  - You will not be able to trace all of your energy usage to the responsible equipment.
  - Operation schedule is just as important as energy use and efficiency data.

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## Preparing an Energy Use Assessment: Establish a Baseline

It is likely that this is an additional task to add to your usual duties.  
Break the process up into palatable chunks ahead of time.



## Preparing an Energy Use Assessment: Establish a Baseline

### ■ What exactly am I collecting?

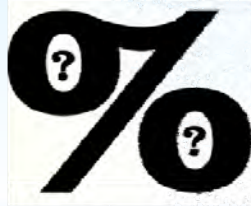
- The energy each piece of equipment consumes and its operating schedule
- Sub-metering data
- Equipment nameplate data on each piece of equipment to approximate the equipment's actual usage.
- Measure the amps for each major motor  
(NOTE: only a trained and qualified professional should do this)



## Preparing an Energy Use Assessment: Establish a Baseline

As you are filling out your baseline pay attention to a couple metrics

- Subtotal the energy use by system – as a percentage, which systems are consuming the most energy?



- Average each system's energy consumed per gallon of water treated regardless if the equipment is process or not, lights or sewage fixtures.



## Preparing an Energy Use Assessment: Establish a Baseline

**The point of the initial baseline is to get a general understanding of which assets are the big energy consumers.**

- *These are the areas where you can get good value for making improvements.*
- *Focus on which assets are consuming the most energy.*
- *The point of the baseline involves working in some generalities, rough numbers, industry averages and rules of thumb.*



## Preparing an Energy Use Assessment: Establish a Baseline

After “completing” the initial baseline, keep  
it up to date.



## Preparing an Energy Use Assessment: Baseline Evaluation

- Which assets are dominating your energy consumption?



*Aeration Basins*  
Credit: Athens, TN



*Aeration Basin Pumps*  
Credit: Athens, TN

- The assets that have larger percentages of the total energy consumption are where you want to focus your initial energy looking for improvement efforts.



## Preparing an Energy Use Assessment: Baseline Evaluation

- Once there is a baseline then you will be able to easily see if an energy savings idea will actually affect the bottom line.
- Having a baseline makes day-to-day decisions easier.





## Preparing an Energy Use Assessment: Baseline Evaluation

- Just having an organized baseline can help you identify improvements you may have never considered
  - You may be shocked by what percentage of your energy use is consumed by lighting, digester pumps, etc.
- A baseline allows you to quickly see the impact of changes to your budget



# Preparing an Energy Use Assessment: Baseline Evaluation

- Energy bill usage trends can also hint towards opportunities for improvement.
- Seasonal increases are expected, but drastic swings could point to a greater issue in HVAC or process design.
- Increases in cost per gallon treated can show that aging major equipment is becoming ineffective.



- [illegible]



# How the Energy Use Tool can Help Drinking Water And Wastewater Systems

*Wet-well and Piping*  
*Credit: Jackson, SC*

**The tool:**

- Acts as a repository of up to 5 years of your energy use, cost, equipment and operational data
- Analyzes your data and displays cost and energy use trends
- Details lighting and HVAC
- Compiles equipment data

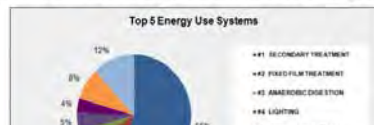


# How the Energy Use Tool can Help Drinking Water And Wastewater Systems

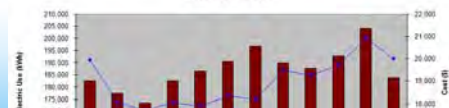
## The tool:

- Provides a summary report
  - Presentation of energy consumption and costs (broad to detail)
  - Graphs energy use over time
  - Highlights areas of energy efficiency

DISTRIBUTION OF ELECTRICAL ENERGY USE & COST BY MAJOR PROCESS FOR 7/2010 - 6/2011



Electric Use vs. Cost



## Agenda

- Why is energy use at water and wastewater systems important?
- What are the steps in an energy use assessment?
- **How can the Energy Use Assessment Tool be used?**
- What are next steps?

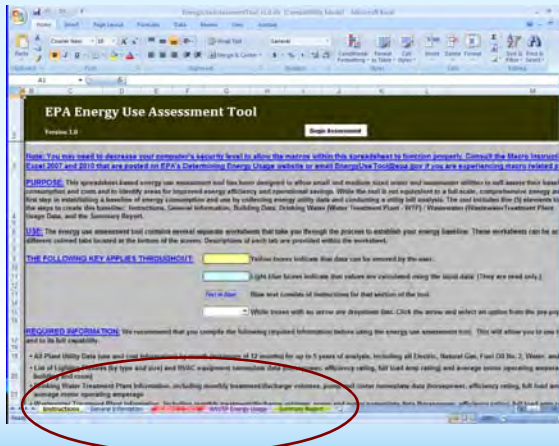




## Energy Use Assessment Tool

Contains 5 tabs to walk you through the process of preparing an energy use assessment

- Instructions Tab
- General Information Tab
- Building Data Tab
- WTP / WWTP Energy Usage Tab
- Summary Report Tab



## EPA's Energy Use Assessment Tool: Information Needed to Enter in the Tool

- **All plant utility data (use and cost information) by month (minimum of 12 months) for up to 5 years of analysis**
  - Collect from utility bills such as electric, natural gas, water/sewer, fuel oil, alternative energy, and other utilities
- **Non-process information (by building)**
  - List of lighting fixtures
  - HVAC equipment
- **Drinking water and/or Wastewater treatment plant information**
  - Monthly treatment/discharge volumes
  - Pump and motor nameplate data (horsepower, efficiency rating, full load amp rating)
  - Average motor operating amperage



## Energy Use Assessment Tool

### ■ Setup Instructions

- Saving a Copy of the Tool
- Enabling Macros
- Changing Security Levels

### ■ Instructions Tab

### ■ General Information Tab

### ■ Building Data Tab

### ■ WTP / WWTP Energy Usage Tab

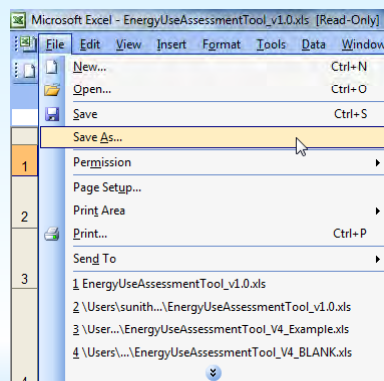
### ■ Summary Report Tab



## Setup Instructions: Saving a Copy of the Tool

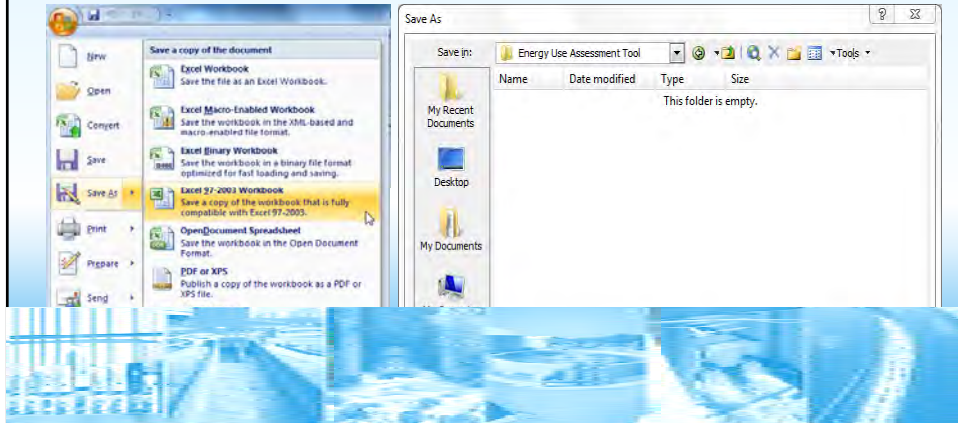
If you are using the tool in Excel 2003, from the File menu, select **Save As** and enter the new file name

Download the Tool at:  
[http://water.epa.gov/infrastructure/sustain/energy\\_use.cfm](http://water.epa.gov/infrastructure/sustain/energy_use.cfm)



## Setup Instructions: Saving a Copy of the Tool

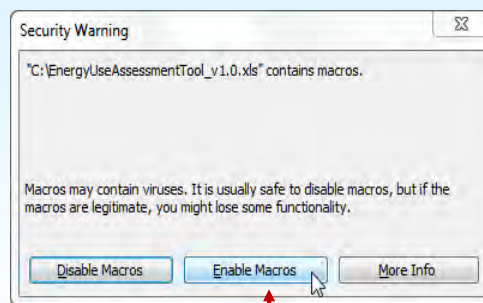
If you are using the tool in Excel 2007 (compatibility mode), click the Office button at the top left of the spreadsheet, click **Save As**, and click the **Excel 97-2003 Workbook** option.



## Setup Instructions: Enabling Macros

If the security level in Excel is set to Medium, when you open the Energy Tool, a warning message appears.

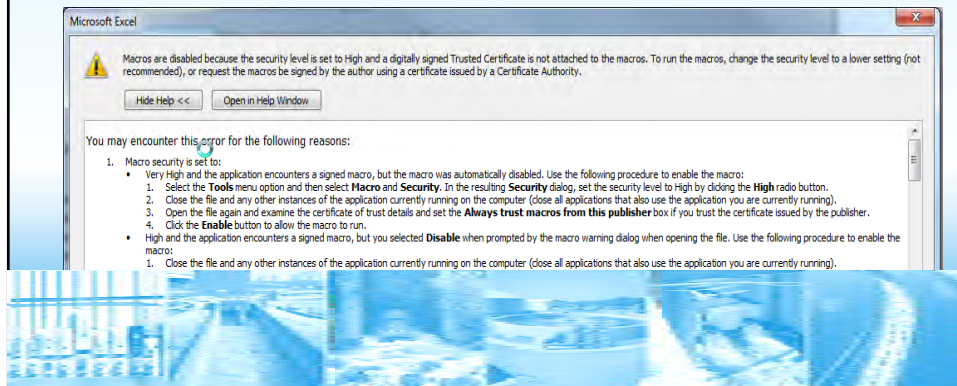
To enable the macros needed for the Energy Tool to function properly, click the **Enable Macros** button. If you do not enable the macros, the tool will not work as designed.



## Setup Instructions: Enabling Macros

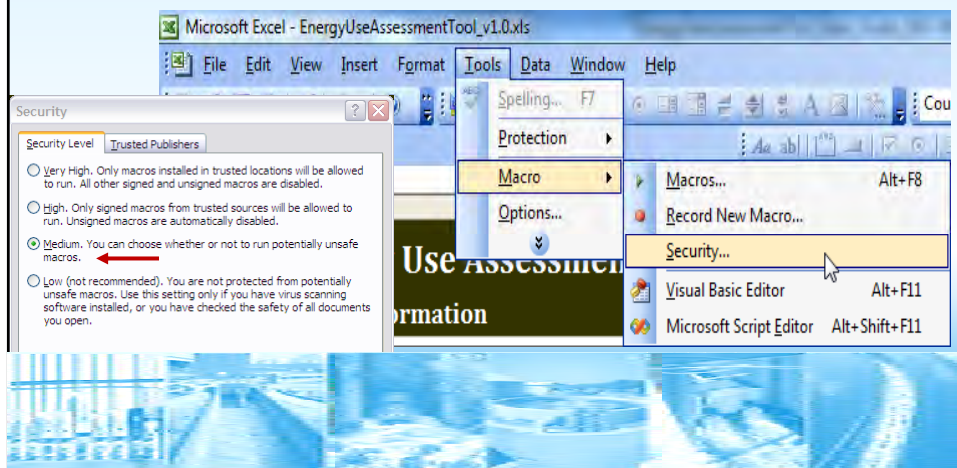
### Security Warning High:

- If the security level is set to High or Very High, the security warning shown appears. Click OK, and then follow the instructions to change the security level to Medium.



## Setup Instructions: Changing Security Levels in Excel 2003

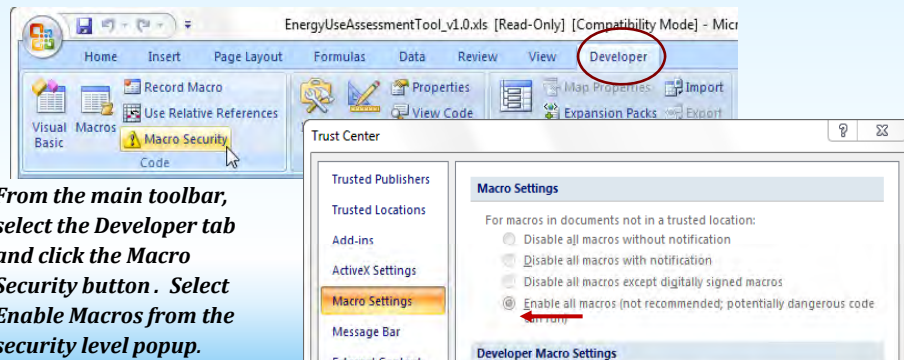
**From the main toolbar click the Tools menu, go to Macro, and click Security. Select Medium or Low from the security level popup.**





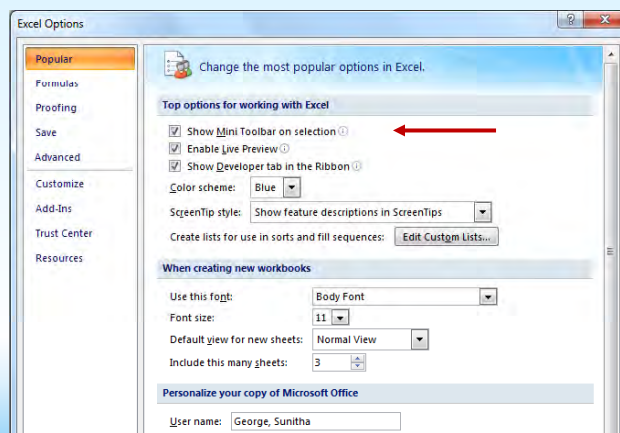
## Setup Instructions: Changing Security Levels in Excel 2007

In Excel 2007, you can change macro security settings in the Trust Center, unless a system administrator has changed the default settings.



*From the main toolbar, select the Developer tab and click the Macro Security button. Select Enable Macros from the security level popup.*

## Setup Instructions: Changing Security Levels in Excel 2007



### Hint:

If the Developer tab is not displayed, click the Microsoft Office Button then click the Excel Options button on the bottom of the popup. In the Excel Option popup, select the Popular category. Under Top options for working with Excel, click Show Developer tab in the Ribbon .

# Energy Use Assessment Tool

- Setup Instructions
- **Instructions Tab**
  - Getting Started – Collect Your Information
  - Collect This Information
  - Follow Directions
  - Begin the Assessment
  - Select Drinking Water System or Wastewater System
- General Information Tab
- Building Data Tab
- WTP / WWTP Energy Usage Tab
- Summary Reports Tab



## Instructions Tab

**EPA Energy Use Assessment Tool**  
Version 1.0 [Begin Assessment](#)

**Note:** You may need to decrease your computer's security level to allow the macros within this spreadsheet to function properly. Consult the Macro Instructions for Microsoft Excel 2007 and 2010 that are posted on EPA's Determining Energy Usage website or email [EnergyUseTool@epa.gov](mailto:EnergyUseTool@epa.gov) if you are experiencing macro related problems.

**PURPOSE:** This spreadsheet-based energy use assessment tool has been designed to allow small and medium sized water and wastewater utilities to self assess their baseline energy consumption and costs and to identify areas for improved energy efficiency and operational savings. While the tool is not equivalent to a full-scale, comprehensive energy audit, it provides the first step in establishing a baseline of energy consumption and use by collecting energy utility data and conducting a utility bill analysis. The tool includes five (5) elements to take you through the steps to create this baseline: Instructions, General Information, Building Data, Drinking Water (Water Treatment Plant - WTP) / Wastewater (Wastewater Treatment Plant - WWTP) Energy Usage Data, and the Summary Report.

**USE:** The energy use assessment tool contains several separate worksheets that take you through the process to establish your energy baseline. These worksheets can be accessed using the different colored tabs located at the bottom of the screen. Descriptions of each tab are provided within the worksheet.

**THE FOLLOWING KEY APPLIES THROUGHOUT:**

- Yellow boxes indicate that data can be entered by the user.
- Light blue boxes indicate that values are calculated using the input data. (They are read only.)
- Blue text consists of instructions for that section of the tool.
- White boxes with an arrow are dropdown lists. Click the arrow and select an option from the pre-populated list.

**REQUIRED INFORMATION:** We recommend that you compile the following required information before using the energy use assessment tool. This will allow you to use the tool with ease and to its full capability.



## Instructions Tab: Getting Started – Collect Information



### ■ Collect Your Information

- Gather it before using the Energy Tool and entering your data
- Work with the data you have available
- Enter the rest of your data later

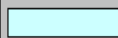


## Instructions Tab: Follow Directions

- **Read the instructions.** There are brief directions on how to use the tool, how to enter data, and how to navigate through the tool.
- **Note the color-coded keys used through out the tool.**



Yellow boxes indicate that data can be entered by the user



Light blue boxes indicate that values are calculated using the input data. (They are read only.)

*Text in Blue*

Blue text consists of instructions for that section of the tool.

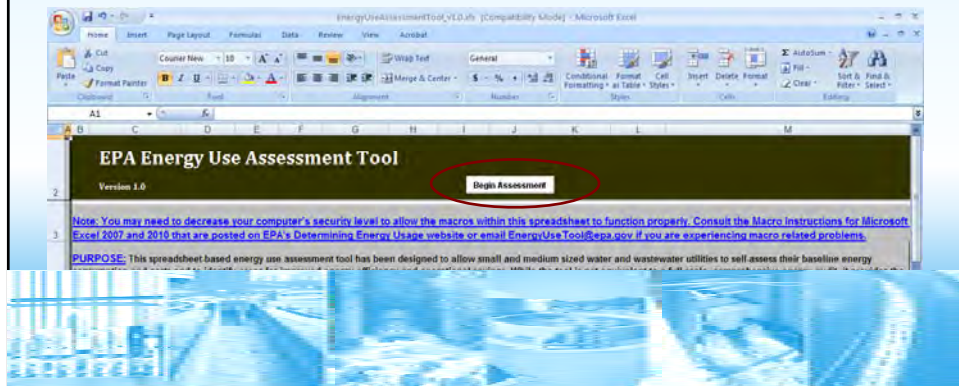


White boxes with an arrow are dropdown lists. Click the arrow and select an option from the pre-populated list.



## Instructions Tab: Begin the Assessment

Click the Begin Assessment button at the top and you will be automatically taken to the General Information tab or click the General Information tab at the bottom.



## Instructions Tab: Select Drinking Water System or Wastewater System

A screenshot of a dialog box titled 'Select Drinking Water/Wastewater Template'. The dialog box contains the text 'Select whether the tool will be used for a Drinking Water Plant or a Wastewater Plant.' Below this text is a label 'Template for Tool:' followed by a dropdown menu. The dropdown menu is open, showing two options: 'Wastewater Systems' (which is highlighted) and 'Drinking Water Systems'. The background of the slide features a blue-tinted image of a water treatment facility.

*Note: if your system is both a drinking water and a wastewater system that **share the same facility information**, you can enter data for both plants within the same spreadsheet.*

# Energy Use Assessment Tool

- Setup Instructions
- Instructions Tab
- **General Information Tab**
  - Navigation Buttons
  - Entering Background Information
  - Entering Utility Bill Information
- Building Data Tab
- WTP / WWTP Energy Usage Tab
- Summary Reports Tab



## General Information Tab

**EPA Energy Use Assessment Tool for Drinking Water Systems**

**General Information** | Building Data | Plant Energy Usage | Reset Data | Save

To switch between data entry for Drinking Water Systems or Wastewater Systems, click the "Select/Switch Template" button above. You can use the tool to enter data for either Drinking Water Systems or Wastewater Systems but not both at the same time. However, if the data entered on the General Information tab is applicable to both plants, you can switch between templates to enter data and view the reports for any selected system type. If the facility information is different, you will need to save a separate copy of the tool for each type.

To analyze costs associated with your facility building(s), click the "Building Data" button above or the "Building Data" tab below.

To analyze total plant energy costs, click the "Plant Energy Usage" button above or the "WTP or WWTP Energy Usage" tab below.

Enter the following general information about the plant.

**BACKGROUND INFORMATION**

Project		Project Reference	
Facility Name			
Site Address		Treatment Operation	Hrs/Yr
State			
ZIP		Date of Assessment	



## General Information Tab: Navigation Buttons

The navigation buttons are at the top of the General Information tab.



Drinking Water Systems

Select/Switch Template

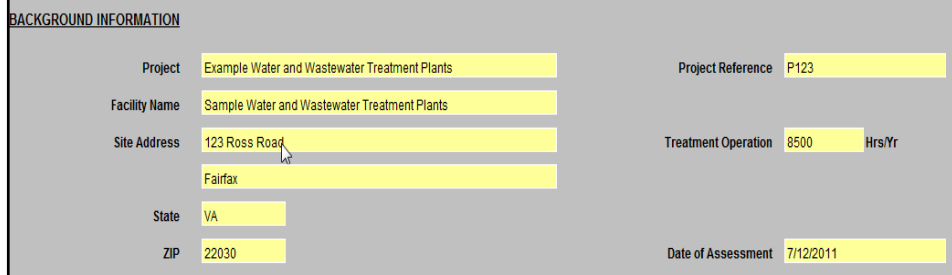
Building Data Plant Energy Usage Reset Data Save

*Note: if your system is both a drinking water and a wastewater system that **share the same facility information**, you can enter data for both plants within the same spreadsheet.*



## General Information Tab: Entering Background Information

Use the Background Information form on the General Information tab to enter the general site information. The information is displayed in the final summary report.



BACKGROUND INFORMATION

Project Example Water and Wastewater Treatment Plants Project Reference P123

Facility Name Sample Water and Wastewater Treatment Plants

Site Address 123 Ross Road  
Fairfax

State VA

ZIP 22030

Treatment Operation 8500 Hrs/Yr

Date of Assessment 7/12/2011



## General Information Tab: Entering Utility Bill Information

The plant's typical monthly energy use and cost data would fall into the different categories shown. These include the electricity, natural gas, water and sewer, oil/fuel, and so on, usage and costs.

Specify Units for Treatment Volume: MGAL

Specify Units for Alternative Energy Consumption: CCF, Propane, GAL

Specify Other Utility Type (if any):

Specify Units for Other Energy Consumption (if any):

Electric (\$/kWh)

2011	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL (Yr)	Average	% of Goal
Electricity Cost (\$)	\$10,164.32	\$10,402.46	\$10,247.76	\$10,704.16	\$20,516.42	\$15,897.44							\$117,556.54	\$10,552.78	85.3%
Consumption (kWh)	196,800	199,000	187,000	192,000	204,000	183,800							1,154,800.00	192,466.67	

## General Information Tab: Spreadsheet Calculations

The spreadsheet calculates the site's total utility cost per treatment volumes, electrical energy use, and average utility rate per individual utility, and displays a summary for each year of data entered.

Total Utility Cost Per Million Gallons Treated (\$/MGAL) 2011	\$464.44
Total Utility Cost Per Million Gallons Treated (\$/MGAL) 2010	\$407.67
Total Utility Cost Per Million Gallons Treated (\$/MGAL) 2009	\$331.13
Total Utility Cost Per Million Gallons Treated (\$/MGAL) 2008	\$279.39
Total Utility Cost Per Million Gallons Treated (\$/MGAL) 2007	\$239.11
Electrical Energy Utilization (kWh/MGAL) 2011	1,747.74
Electrical Energy Utilization (kWh/MGAL) 2010	1,687.25
Electrical Energy Utilization (kWh/MGAL) 2009	1,588.91
Electrical Energy Utilization (kWh/MGAL) 2008	1,487.68
Electrical Energy Utilization (kWh/MGAL) 2007	1,506.90



## General Information Tab: Cogeneration Data

*Cogen Electricity* + *Purchased Electricity* → *Electricity Consumption*

*Cogen Electrical Costs* + *Cogen Natural Gas Costs* + *Cogen Direct Purchased Natural Gas Costs* → *Electricity Cost*



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## Energy Use Assessment Tool

- Setup Instructions
- Instructions Tab
- General Information Tab
- **Building Data Tab**
  - Navigational Buttons
  - Total Plant Building Information
  - Building Information
  - Lighting Fixtures
  - HVAC/Non-Process Units
- WTP / WWTP Energy Usage Tab
- Summary Reports Tab



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## Building Data Tab

## Building Data Tab: Navigational Buttons

The tool allows you to enter data for up to 10 buildings.  
The building data tabs are numbered from 1 to 10, and  
all 10 tabs follow the same format.

## Building Data Tab: Set Number of Buildings and Rooms

- Use the Set # of Buildings button to set the desired number of rooms on-site. The Set # of Buildings button appears only on the Building 1 Data tab.

Total Number of Buildings On-site   *! Reducing the number of buildings will delete any data entered on the additional tabs*

- For each building, you must select the number of rooms for which you want to enter data.

No. of Rooms   *! Changing the number of rooms will reset all lighting data entered.*



## Building Data Tab: Total Plant Building Information

- The top section of all building tabs displays a summary of the information entered on all the building tabs.
- However, the “Does the site have buildings” and “Set # of Buildings” fields are clickable only on the building 1 tab. On all other tabs, those fields are display only.

Total Plant Building Area  Ft<sup>2</sup>      Total Plant Building Electric Load  kW      Total Plant Building Electric Use  kWh/Yr

Does the site have buildings? ☒ Yes ☐ No      Total Number of Buildings On-site   *! Reducing the number of buildings will delete any data entered on the additional tabs*



## Building Data Tab: Building Information


- Enter general information about each building including:
  - name of the building,
  - number of rooms,
  - operating hours

\* Set the number of rooms in the building before entering any lighting data.

**BUILDING 1**

Name	Administration	Operating Hours per Year	2,496 Hrs/Yr	Approximate Building Age (If known)		Yrs
Area	3,600 Ft <sup>2</sup>	Operating Hours per Day	8 Hrs/Day			
No. of Rooms	4	Operating Days per Week	5 Days/Wk	Average Building Lighting Power Density (LPD)	7.36	W/ft <sup>2</sup>
				! Changing the number of rooms will reset all lighting data entered.		

Estimated Electric Load:		Estimated Annual Energy Use:		Estimated Annual Energy Cost:	
Total Building 1 Lighting	27 kW	Total Building 1 Lighting	66,164 kWh/Yr	Total Building 1 Lighting	\$ 6,695.79 \$/Yr
Total Building 1 HVAC		Total Building 1 HVAC		Total Building 1 HVAC	




## Building Data Tab: Lighting Fixtures

To determine the site's lighting loads and energy use, describe each room's lighting fixture types and counts by using the selectable input fields.

Room 1 Name	Conference Room	Area	600 Ft <sup>2</sup>
Room 1 Lighting (Main Lighting only - Do not include task lights)			
Select up to 6 Light Fixture Types		Fixture Qty	Total Room Wattage (W)
Light Type 1	Four F40T12 4' 40W Fluorescent La	175 Watts	16
Light Type 2	Select Light Fixture	Total Watts	2,830 W
Light Type 3	Select Light Fixture	Total Watts	
Light Type 4	Select Light Fixture	Total Watts	Room Lighting Power Density (LPD)
Light Type 5	Select Light Fixture	Total Watts	4.72 W/ft <sup>2</sup>
Other Type : Name	Exit Sign		
: Watts	15		

Room 1 Name	Conference Room	Area	
Room 1 Lighting (Main Lighting only - Do not include task lights)			
Select up to 6 Light Fixture Types			
Light Type 1	Four F40T12 4' 40W Fluorescent La	175 Watts	
Light Type 2	Select Light Fixture	Watts	
Light Type 3	One F40T12 4' 40W Fluorescent Lamp, Electronic Ballast	Watts	
Light Type 4	Two F40T12 4' 40W Fluorescent Lamps, Electronic Ballast	Watts	
	Three F40T12 4' 40W Fluorescent Lamps, Electronic Ballast	Watts	



## Building Data Tab: Lighting Fixtures

- Enter the area for each room, and the tool provides the Lighting Power Density (LPD) in watts per square foot for each room.
- The tool totals the rooms' lighting loads, each building's lighting energy use, and the site's total lighting energy use per year for use in other areas of this tool.

Room 1 Name **Conference Room** Area **600 Ft<sup>2</sup>**

Room 1 Lighting (Main Lighting only - Do not include task lights)

Select up to 6 Light Fixture Types

Light Type	Fixture Qty	Total Watts
Light Type 1: Four F40T12 4' 40W Fluorescent La	16	175 Watts
Light Type 2: Select Light Fixture		Total Watts
Light Type 3: Select Light Fixture		Total Watts
Light Type 4: Select Light Fixture		Total Watts
Light Type 5: Select Light Fixture		Total Watts
Other Type : Name: Exit Sign	2	15 Watts

Total Room Wattage (W) **2,830 W**

Room Lighting Power Density (LPD) **4.72 W/ft<sup>2</sup>**



## Building Data Tab: HVAC / Non-Process Units

- Non-Process HVAC is meant to include all equipment not tied to specific process operations.
- Do not provide process-related ventilation equipment, such as odor control fans here. You can include process equipment on the WTP or WWTP Energy Use tabs.

System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Motor Operating Hours (Hours/Year)	Average Load Factor (%)	Average HVAC Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Year)	Estimated Percent of Site Electric Use & Cost (%)
Non Process HVAC	Compressor	Air Conditioner	3	88%	4	3.5	2,500	87.50%	2.23	5,563.21	\$563.00	0.25%
Non Process HVAC	Fan	HVAC	5	86%	6	4	4,400	66.67%	2.89	12,722.48	\$1,287.51	0.57%
Non Process HVAC	Solid Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Solid Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Solid Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Solid Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Total Building HVAC										18,285.69	\$1,850.51	0.82%



## Building Data Tab: HVAC / Non-Process Units

To determine the site's non-process heating, ventilating, and air conditioning (HVAC) loads and energy use, describe each building's HVAC electrical users and counts by entering them in the table as shown.

System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Motor Operating Hours (Hours/Year)	Average Load Factor (%)	Average HVAC Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Year)	Estimated Percent of Site Electric Use & Cost (%)
Non Process HVAC	Compressor	Air Conditioner	3	88%	4	3.5	2,500	87.50%	2.23	5,563.21	\$563.00	0.25%
Non Process HVAC	Fan	HVAC	5	86%	6	4	4,400	66.67%	2.89	12,722.48	\$1,287.51	0.57%
Non Process HVAC	Selected Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Selected Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Selected Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Selected Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Total Building HVAC									5.12	18,285.69	\$1,850.51	0.81%



## Building Data Tab: HVAC / Non-Process Units

Enter the motor's average operating current. Once the equipment's typical operating hours are entered, the tool calculates the estimated annual energy use and operating cost for the unit.

System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Motor Operating Hours (Hours/Year)	Average Load Factor (%)	Average HVAC Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Year)	Estimated Percent of Site Electric Use & Cost (%)
Non Process HVAC	Compressor	Air Conditioner	3	88%	4	3.5	2,500	87.50%	2.23	5,563.21	\$563.00	0.25%
Non Process HVAC	Fan	HVAC	5	86%	6	4	4,400	66.67%	2.89	12,722.48	\$1,287.51	0.57%
Non Process HVAC	Selected Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Selected Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Selected Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Selected Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Total Building HVAC									5.12	18,285.69	\$1,850.51	0.81%



## Building Data Tab: HVAC / Non-Process Units

If conditions change in the plant, you can adjust the equipment size, current reading, operating hours and number of equipment in use values.

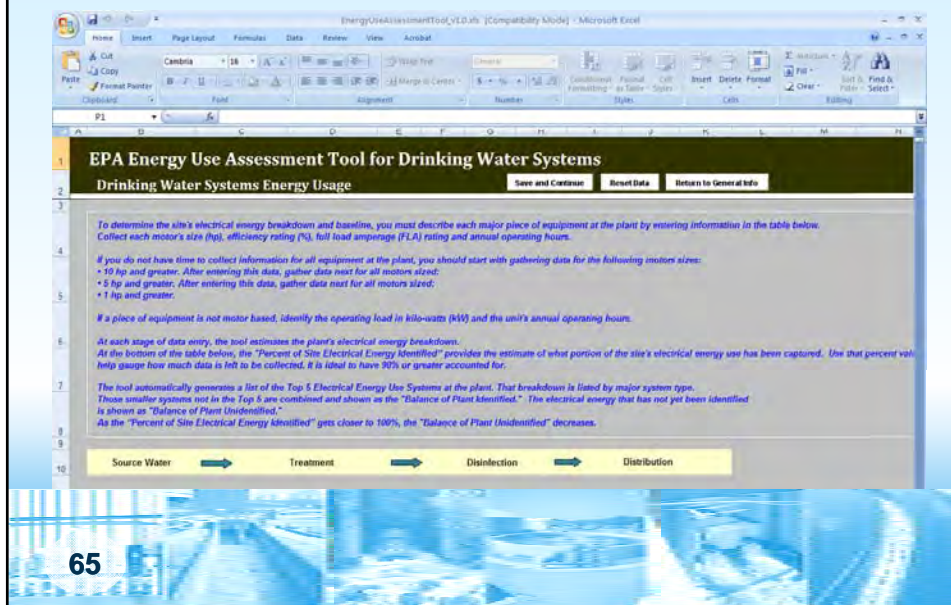
System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Motor Operating Hours (Hours/Year)	Average Load Factor (%)	Average HVAC Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Year)	Estimated Percent of Site Electric Use & Cost (%)
Non Process HVAC	Compressor	Air Conditioner	3	88%	4	3.5	2,500	87.50%	2.23	5,563.21	\$563.00	0.25%
Non Process HVAC	Fan	HVAC	5	86%	6	4	4,400	66.67%	2.89	12,722.48	\$1,287.51	0.57%
Non Process HVAC	Select Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Select Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Select Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Non Process HVAC	Select Equipment							0.00%	0.00	0.00	\$0.00	0.00%
Total Building HVAC									5.12	18,285.69	\$1,850.51	0.81%

## Energy Use Assessment Tool

- Setup Instructions
- Instructions Tab
- General Information Tab
- Building Data Tab
- **WTP / WWTP Energy Usage Tab**
  - HVAC and Lighting Totals
  - Plant Equipment Electrical Energy Inventory
- Summary Reports Tab



## WTP / WWTP Energy Usage Tab



## WTP / WWTP Energy Usage Tab: HVAC and Lighting Totals

- The lighting and HVAC loads, use, and cost for all the buildings entered for the facility on the Building Data tabs are totaled and displayed in the section on the WTP / WWTP Energy Usage tab.
- Use this information (i.e., the values shown in #1 & #2) to enter the HVAC and lighting into the equipment inventory table. You could enter the lighting and HVAC as separate entries or as a single entry using the combined value shown in #3.

Estimated Average Building Electric Loads:			Estimated Building Annual Energy Use:			Estimated Building Annual Energy Cost:		
Total Plant Building(s) Lighting	12.77	kW	<b>1</b> Total Plant Building(s) Lighting	111,888	kWh/yr	Total Plant Building(s) Lighting	\$11,323	\$/yr
Total Plant Building(s) HVAC	7.36	kW	<b>2</b> Total Plant Building(s) HVAC	64,455	kWh/yr	Total Plant Building(s) HVAC	\$6,623	\$/yr
Total Plant Building(s) Combined	20.13	kW	<b>3</b> Total Plant Building(s) Combined	176,343	kWh/yr	Total Plant Building(s) Combined	\$17,946	\$/yr

## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

- Collect each motor's size (hp), efficiency rating (%), full load amperage (FLA) rating and annual operating hours.
- If you do not have time to collect information for all equipment at the plant, you should start with gathering data for the following motors sizes:
  - 10 hp and greater. After entering this data, gather data next for all motors sized:
  - 5 hp and greater. After entering this data, gather data next for all motors sized:
  - 1 hp and greater.
- If a piece of equipment is not motor based, identify the operating load in kilowatts (kW) and the unit's annual operating hours.
- With each row of data entry, the tool estimates the plant's electrical energy breakdown.



## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

1. Identify and select the System Type and Equipment Type from the dropdown menus for each piece of equipment recognized at the plant. To enter system types not listed in the list, from the **System Type** dropdown list, select 'Other'.

System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Operating Hours (Hrs/Yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Yr)	Estimated Percent of Site Electric Use & Cost (%)
Lighting	Other kW Load	All Site Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,865	\$11,321	4.98%
Non Process HVAC	Other kW Load	All Site HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	\$6,525	2.87%
Influent Pumping	Pump	Infl Pump Station	25	89.0 %	20	17	4,700	85.00%	18.01	84,667	\$8,568	3.77%
Primary Treatment	Blower	Grit Blowers	7.5	89.0 %	6	5.5	8,760	68.75%	4.32	37,861	\$3,831	1.68%
Primary Treatment	Blower	Channel Blower	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%
Secondary Treatment	Blower	Secondary Blowers	200	91.0 %	225	185	8,760	82.22%	134.81	1,180,921	\$119,509	52.53%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.81	60,664	\$6,139	2.70%
Secondary Treatment	Pump	WAS Pumps	7.5	86.0 %	8	4	1,460	80.00%	3.25	4,749	\$481	0.21%
Fixed Film Treatment	Pump	R Tower Pumps	60	91.0 %	65	36	8,760	65.38%	27.24	238,639	\$24,150	10.62%
Anaerobic Digestion	Pump	Sludge Recir Pump	5	89.0 %	4	5	8,760	83.33%	3.66	32,034	\$3,242	1.43%
Anaerobic Digestion	Mixer	Gas Mixer	10	88.0 %	12	9	8,760	75.00%	6.36	55,996	\$5,636	2.48%
Anaerobic Digestion	Other kW Load	Mixer Heater	N/A	N/A	N/A	N/A	2,500	100.00%	7.20	18,000	\$1,822	0.80%
Effluent Pumping/Storage	Pump											



## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

- Enter a unique Equipment Description to keep track of each piece of equipment. That can be the system's identification name or number.

EQUIPMENT ELECTRICAL ENERGY INVENTORY												
System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Operating Hours (Hrs/Yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Yr)	Estimated Percent of Site Electric Use & Cost (%)
Lighting	Other kW Load	All Site Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,865	\$11,321	4.98%
Non Process HVAC	Other kW Load	All Site HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	\$6,525	2.87%
Influent Pumping	Pump	Infl Pump Station	25	88.0 %	20	17	4,700	85.00%	18.01	84,667	\$8,568	3.77%
Primary Treatment	Blower	Grit Blowers	7.5	89.0 %	8	5.5	8,760	68.75%	4.32	37,861	\$3,831	1.68%
Primary Treatment	Blower	Channel Blower	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	8,760	82.22%	134.81	1,180,921	\$119,509	52.53%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.81	60,664	\$6,139	2.70%
Secondary Treatment	Pump	WAS Pumps	7.5	86.0 %	8	4	1,460	50.00%	3.25	4,749	\$481	0.21%
Fixed Film Treatment	Pump	R Tower Pumps	60	91.0 %	65	36	8,760	55.38%	27.24	238,639	\$24,150	10.62%
Anaerobic Digestion	Pump	Sludge Recir Pump	5	85.0 %	6	5	8,760	83.33%	3.66	32,034	\$3,242	1.43%
Anaerobic Digestion	Mixer	Gas Mixer	10	88.0 %	12	9	8,760	75.00%	6.36	55,696	\$5,636	2.48%
Anaerobic Digestion	Other kW Load	Mixer Heater	N/A	N/A	N/A	N/A	2,500	100.00%	7.20	18,000	\$1,822	0.80%
Effluent Pumping/Storage	Pump	Effluent Pumps	7.5	91.0 %	8	6	4,416	75.00%	4.51	20,363	\$2,061	0.91%



## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

- Collect and enter the motor size, efficiency, and full load amperage ratings. That information is on the equipment's nameplate or specification datasheet.

EQUIPMENT ELECTRICAL ENERGY INVENTORY												
System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Operating Hours (Hrs/Yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Yr)	Estimated Percent of Site Electric Use & Cost (%)
Lighting	Other kW Load	All Site Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,865	\$11,321	4.98%
Non Process HVAC	Other kW Load	All Site HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	\$6,525	2.87%
Influent Pumping	Pump	Infl Pump Station	25	88.0 %	20	17	4,700	85.00%	18.01	84,667	\$8,568	3.77%
Primary Treatment	Blower	Grit Blowers	7.5	89.0 %	8	5.5	8,760	68.75%	4.32	37,861	\$3,831	1.68%
Primary Treatment	Blower	Channel Blower	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	8,760	82.22%	134.81	1,180,921	\$119,509	52.53%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.81	60,664	\$6,139	2.70%
Secondary Treatment	Pump	WAS Pumps	7.5	86.0 %	8	4	1,460	50.00%	3.25	4,749	\$481	0.21%
Fixed Film Treatment	Pump	R Tower Pumps	60	91.0 %	65	36	8,760	55.38%	27.24	238,639	\$24,150	10.62%
Anaerobic Digestion	Pump	Sludge Recir Pump	5	85.0 %	6	5	8,760	83.33%	3.66	32,034	\$3,242	1.43%
Anaerobic Digestion	Mixer	Gas Mixer	10	88.0 %	12	9	8,760	75.00%	6.36	55,696	\$5,636	2.48%
Anaerobic Digestion	Other kW Load	Mixer Heater	N/A	N/A	N/A	N/A	2,500	100.00%	7.20	18,000	\$1,822	0.80%
Effluent Pumping/Storage	Pump	Effluent Pumps	7.5	91.0 %	8	6	4,416	75.00%	4.51	20,363	\$2,061	0.91%





## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

4. Collect and enter the motor's average operating current. If you are unable to measure the motor's typical operating current, the tool provides 75% as the default value for the unit's Average Load Factor.

EQUIPMENT ELECTRICAL ENERGY INVENTORY												
System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Operating Hours (Hrs/Yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Yr)	Estimated Percent of Site Electric Use & Cost (%)
Lighting	Other kW Load	All Site Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,865	\$11,321	4.98%
Non Process HVAC	Other kW Load	All Site HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	\$6,525	2.87%
Influent Pumping	Pump	Infl Pump Station	25	89.0 %	20	17	4,700	85.00%	18.01	84,667	\$8,568	3.77%
Primary Treatment	Blower	Grit Blowers	7.5	89.0 %	8	5.5	8,760	68.75%	4.32	37,861	\$3,831	1.68%
Primary Treatment	Blower	Channel Blower	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	8,760	82.22%	134.81	1,180,921	\$119,509	52.53%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.81	60,664	\$6,139	2.70%
Secondary Treatment	Pump	WAS Pumps	7.5	86.0 %	8	4	1,460	50.00%	3.25	4,749	\$481	0.21%
Fixed Film Treatment	Pump	R Tower Pumps	60	91.0 %	65	36	8,760	55.38%	27.24	238,639	\$24,150	10.62%
Anaerobic Digestion	Pump	Sludge Recir Pump	5	85.0 %	6	5	8,760	83.33%	3.66	32,034	\$3,242	1.43%
Anaerobic Digestion	Mixer	Gas Mixer	10	88.0 %	12	9	8,760	75.00%	6.36	55,996	\$5,636	2.48%
Anaerobic Digestion	Other kW Load	Mixer Heater	N/A	N/A	N/A	N/A	2,500	100.00%	7.20	18,000	\$1,822	0.80%
Effluent Pumping/Storage	Pump	Effluent Pump	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%

## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

5. Enter the annual operating hours. If that information is not tracked for the unit, estimate the value. You can readjust the value later.

EQUIPMENT ELECTRICAL ENERGY INVENTORY													
System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Operating Hours (Hrs/Yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Yr)	Estimated Percent of Site Electric Use & Cost (%)	
Lighting	Other kW Load	All Site Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,865	\$11,321	4.98%	
Non Process HVAC	Other kW Load	All Site HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	\$6,525	2.87%	
Influent Pumping	Pump	Infl Pump Station	25	88.0 %	20	17	4,700	85.00%	18.01	84,667	\$8,568	3.77%	
Primary Treatment	Blower	Grit Blowers	7.5	89.0 %	8	5.5	8,760	68.75%	4.32	37,861	\$3,831	1.68%	
Primary Treatment	Blower	Channel Blower	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%	
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	8,760	82.22%	134.81	1,180,921	\$119,509	52.53%	
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.81	60,664	\$6,139	2.70%	
Secondary Treatment	Pump	WAS Pumps	7.5	86.0 %	8	4	1,460	50.00%	3.25	4,749	\$481	0.21%	
Fixed Film Treatment	Pump	R Tower Pumps	60	91.0 %	65	36	8,760	55.38%	27.24	238,639	\$24,150	10.62%	
Anaerobic Digestion	Pump	Sludge Recir Pump	5	85.0 %	6	5	8,760	83.33%	3.66	32,034	\$3,242	1.43%	
Anaerobic Digestion	Mixer	Gas Mixer	10	88.0 %	12	9	8,760	75.00%	6.36	55,996	\$5,636	2.48%	
Anaerobic Digestion	Other kW Load	Mixer Heater	N/A	N/A	N/A	N/A	2,500	100.00%	7.20	18,000	\$1,822	0.80%	

## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

- 6a. If the piece of equipment is not motor based or if a total system load has already been identified, in the **System Type** dropdown list, select the appropriate system type and from the **Equipment Type** dropdown list, select **Other kW Load**.

EQUIPMENT ELECTRICAL ENERGY INVENTORY												
System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA) (A)	Average Motor Operating Current (Amps)	Operating Hours (Hrs/Yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Yr)	Estimated Percent of Site Electric Use & Cost (%)
Lighting	Other kW Load	All Site Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,065	\$11,321	4.98%
Non Process HVAC	Other kW Load	All Site HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	\$6,525	2.67%
Influent Pumping	Pump	Infl Pump Station	25	88.0 %	20	17	4,700	85.00%	18.01	84,667	\$8,568	3.77%
Primary Treatment	Blower	Grit Blowers	7.5	89.0 %	8	5.5	8,760	68.75%	4.32	37,661	\$3,831	1.68%
Primary Treatment	Blower	Channel Blower	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.91	1,180,591	\$110,606	85.63%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.91	60,664	\$6,139	2.70%
Secondary Treatment	Pump	WAS Pumps	7.5	86.0 %	8	4	1,460	59.00%	3.25	4,749	\$481	0.21%
Fixed Film Treatment	Pump	R Tower Pumps	50	91.0 %	65	36	8,760	55.38%	27.24	238,939	\$24,150	10.62%
Anaerobic Digestion	Pump	Sludge Recir Pump	5	85.0 %	6	5	8,760	83.33%	3.66	32,034	\$3,242	1.43%
Anaerobic Digestion	Mixer	Gas Mixer	10	88.0 %	12	9	8,760	75.00%	6.36	55,696	\$5,636	2.48%
Anaerobic Digestion	Other kW Load	Mixer Heater	N/A	N/A	N/A	N/A	2,500	100.00%	7.20	18,000	\$1,822	0.80%



## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

- 6b. You can then enter the annual operating hours into the respective cell and electrical energy load in kW into the column titled **Average Electric Load (kW)**.

EQUIPMENT ELECTRICAL ENERGY INVENTORY												
System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA) (A)	Average Motor Operating Current (Amps)	Operating Hours (Hrs/Yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Yr)	Estimated Percent of Site Electric Use & Cost (%)
Lighting	Other kW Load	All Site Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,065	\$11,321	4.98%
Non Process HVAC	Other kW Load	All Site HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	\$6,525	2.67%
Influent Pumping	Pump	Infl Pump Station	25	88.0 %	20	17	4,700	85.00%	18.01	84,667	\$8,568	3.77%
Primary Treatment	Blower	Grit Blowers	7.5	89.0 %	8	5.5	8,760	68.75%	4.32	37,661	\$3,831	1.68%
Primary Treatment	Blower	Channel Blower	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.91	1,180,591	\$110,606	85.63%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.91	60,664	\$6,139	2.70%
Secondary Treatment	Pump	WAS Pumps	7.5	86.0 %	8	4	1,460	59.00%	3.25	4,749	\$481	0.21%
Fixed Film Treatment	Pump	R Tower Pumps	50	91.0 %	65	36	8,760	55.38%	27.24	238,939	\$24,150	10.62%
Anaerobic Digestion	Pump	Sludge Recir Pump	5	85.0 %	6	5	8,760	83.33%	3.66	32,034	\$3,242	1.43%
Anaerobic Digestion	Mixer	Gas Mixer	10	88.0 %	12	9	8,760	75.00%	6.36	55,696	\$5,636	2.48%
Anaerobic Digestion	Other kW Load	Mixer Heater	N/A	N/A	N/A	N/A	2,500	100.00%	7.20	18,000	\$1,822	0.80%



## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

7. If you need to add more equipment than the table allows, click the **Add Row** button. You may add as many rows as you wish.

EQUIPMENT ELECTRICAL ENERGY INVENTORY												
System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Operating Hours (Hrs/Yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Yr)	Estimated Percent of Site Electric Use & Cost (%)
Lighting	Other kW Load	All Site Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,865	\$11,321	4.98%
Non Process HVAC	Other kW Load	All Site HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	\$6,525	2.87%
Influent Pumping	Pump	Infl Pump Station	25	89.0 %	20	17	4,700	85.00%	18.01	84,667	\$8,568	3.77%
Primary Treatment	Blower	Grit Blowers	7.5	89.0 %	8	5.5	8,760	68.75%	4.32	37,861	\$3,831	1.68%
Primary Treatment	Blower	Channel Blower	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	8,760	82.22%	134.81	1,180,921	\$119,509	52.53%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.81	60,664	\$6,139	2.70%
Secondary Treatment	Pump	WAS Pumps	7.5	86.0 %	8	4	1,460	50.00%	3.25	4,749	\$481	0.21%
Fixed Film Treatment	Pump	R Tower Pumps	60	91.0 %	65	36	8,760	55.38%	27.24	238,639	\$24,150	10.62%
Anaerobic Digestion	Pump	Sludge Recir Pump	5	85.0 %	6	5	8,760	83.33%	3.66	32,034	\$3,242	1.43%
Anaerobic Digestion	Mixer	Gas Mixer	10	88.0 %	12	9	8,760	75.00%	6.36	55,696	\$5,636	2.48%
Anaerobic Digestion	Other kW Load	Mixer Heater	N/A	N/A	N/A	N/A	2,500	100.00%	7.20	18,000	\$1,822	0.80%
Effluent Pumping/Storage	Pump	Effluent Pump	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%



## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

**Entry Results** – The Energy Tool calculates each equipment's electrical energy values for Average Electric Load (kW), Estimated Annual Energy Use (kWh/yr), and Estimated Annual Operating Costs (\$/yr).

EQUIPMENT ELECTRICAL ENERGY INVENTORY												
System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Operating Hours (Hrs/Yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/Yr)	Estimated Percent of Site Electric Use & Cost (%)
Lighting	Other kW Load	All Site Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,865	\$11,321	4.98%
Non Process HVAC	Other kW Load	All Site HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	\$6,525	2.87%
Influent Pumping	Pump	Infl Pump Station	25	89.0 %	20	17	4,700	85.00%	18.01	84,667	\$8,568	3.77%
Primary Treatment	Blower	Grit Blowers	7.5	89.0 %	8	5.5	8,760	68.75%	4.32	37,861	\$3,831	1.68%
Primary Treatment	Blower	Channel Blower	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	8,760	82.22%	134.81	1,180,921	\$119,509	52.53%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.81	60,664	\$6,139	2.70%
Secondary Treatment	Pump	WAS Pumps	7.5	86.0 %	8	4	1,460	50.00%	3.25	4,749	\$481	0.21%
Fixed Film Treatment	Pump	R Tower Pumps	60	91.0 %	65	36	8,760	55.38%	27.24	238,639	\$24,150	10.62%
Anaerobic Digestion	Pump	Sludge Recir Pump	5	85.0 %	6	5	8,760	83.33%	3.66	32,034	\$3,242	1.43%
Anaerobic Digestion	Mixer	Gas Mixer	10	88.0 %	12	9	8,760	75.00%	6.36	55,696	\$5,636	2.48%
Anaerobic Digestion	Other kW Load	Mixer Heater	N/A	N/A	N/A	N/A	2,500	100.00%	7.20	18,000	\$1,822	0.80%
Effluent Pumping/Storage	Pump	Effluent Pump	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%





## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

**Entry Results** –The tool also provides the Estimated Percent of Site Electric Use & Cost (%) identified as compared to the plant's Actual Annual Electric Use and Cost (actual energy billed).

System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Operating Hours (hrs/yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/yr)	Estimated Percent of Site Electric Use & Cost (%)
Lighting	Other kW Load	All Site Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,865	\$11,321	4.98%
Non Process HVAC	Other kW Load	All Site HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	\$6,525	2.87%
Influent Pumping	Pump	Infl Pump Station	25	89.0 %	20	17	4,700	85.00%	18.01	84,667	\$8,568	3.77%
Primary Treatment	Blower	Grit Blowers	7.5	89.0 %	8	5.5	8,760	68.75%	4.32	37,861	\$3,831	1.68%
Primary Treatment	Blower	Channel Blower	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	8,760	82.22%	124.81	1,180,921	\$119,509	52.53%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.81	60,664	\$6,139	2.70%
Secondary Treatment	Pump	WAS Pumps	7.5	86.0 %	8	4	1,460	50.00%	3.25	4,749	\$481	0.21%
Fixed Film Treatment	Pump	R Tower Pumps	60	91.0 %	65	36	8,760	55.38%	27.24	238,639	\$24,150	10.62%
Anaerobic Digestion	Pump	Sludge Recirc Pump	5	85.0 %	6	5	8,760	83.33%	3.66	32,034	\$3,242	1.43%
Anaerobic Digestion	Mixer	Gas Mixer	10	88.0 %	12	9	8,760	75.00%	6.36	55,696	\$5,636	2.48%
Anaerobic Digestion	Other kW Load	Mixer Heater	N/A	N/A	N/A	N/A	2,500	100.00%	7.20	18,000	\$1,822	0.80%
Effluent Pumping/Storage	Pump	Effluent Pumps	7.5	91.0 %	8	6	4,416	75.00%	4.61	20,363	\$2,061	0.91%
Internal Plant Pumping	Other kW Load		N/A	N/A	N/A	N/A	4,380	75.00%	6.00	21,900	\$2,216	0.97%

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## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

### Entry Results

- Any difference between what electrical energy has been identified and what has been billed is also indicated. (#1)
- The cell labeled Percent of Site Electrical Energy Identified (#2) provides the site with an estimate of what portion of the site's electrical energy use has been captured.

System Type	Equipment Type	Equipment Description	Motor Size (hp)	Motor Efficiency (%)	Motor Full Load Amperage (FLA)	Average Motor Operating Current (Amps)	Operating Hours (hrs/yr)	Average Load Factor (%)	Average Electric Load (kW)	Estimated Annual Energy Use (kWh/yr)	Estimated Annual Operating Costs (\$/yr)	Estimated Percent of Site Electric Use & Cost (%)
Lighting	Other kW Load	All Site Lighting	N/A	N/A	N/A	N/A	8,760	100.00%	12.77	111,865	\$11,321	4.98%
Non Process HVAC	Other kW Load	All Site HVAC	N/A	N/A	N/A	N/A	8,760	100.00%	7.36	64,474	\$6,525	2.87%
Influent Pumping	Pump	Infl Pump Station	25	89.0 %	20	17	4,700	85.00%	18.01	84,667	\$8,568	3.77%
Primary Treatment	Blower	Grit Blowers	7.5	89.0 %	8	5.5	8,760	68.75%	4.32	37,861	\$3,831	1.68%
Primary Treatment	Blower	Channel Blower	10	88.0 %	10.5	6.8	8,760	64.76%	5.49	48,093	\$4,867	2.14%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	8,760	82.22%	124.81	1,180,921	\$119,509	52.53%
Secondary Treatment	Blower	Secondy Blowers	200	91.0 %	225	185	450	82.22%	134.81	60,664	\$6,139	2.70%
Secondary Treatment	Pump	WAS Pumps	7.5	86.0 %	8	4	1,460	50.00%	3.25	4,749	\$481	0.21%
Fixed Film Treatment	Pump	R Tower Pumps	60	91.0 %	65	36	8,760	55.38%	27.24	238,639	\$24,150	10.62%
Anaerobic Digestion	Pump	Sludge Recirc Pump	5	85.0 %	6	5	8,760	83.33%	3.66	32,034	\$3,242	1.43%
Anaerobic Digestion	Mixer	Gas Mixer	10	88.0 %	12	9	8,760	75.00%	6.36	55,696	\$5,636	2.48%
Anaerobic Digestion	Other kW Load	Mixer Heater	N/A	N/A	N/A	N/A	2,500	100.00%	7.20	18,000	\$1,822	0.80%
Effluent Pumping/Storage	Pump	Effluent Pumps	7.5	91.0 %	8	6	4,416	75.00%	4.61	20,363	\$2,061	0.91%
Internal Plant Pumping	Other kW Load		N/A	N/A	N/A	N/A	4,380	75.00%	6.00	21,900	\$2,216	0.97%
<b>And Total</b> <b>78</b>										<b>Estimated Annual WWTP Electric Use &amp; Cost</b> <b>374,890 1,979,925 \$200,368 8.97%</b>		
										<b>Actual Annual WWTP Electric Use &amp; Cost</b> <b>2,248,090 \$227,497</b>		
										<b>Difference Between Billed and Identified</b> <b>-258,075 -\$27,179</b>		
										<b>Percent of Site Electrical Energy Identified</b> <b>88.0%</b>		

78

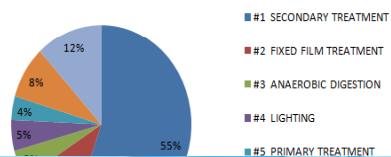
## WTP / WWTP Energy Usage Tab: Plant Equipment Electrical Energy Inventory

**Top Electrical Energy Use Systems** – The Energy Tool generates a list of the Top 5 Electrical Energy Use Systems at the plant . The breakdown is listed by major system type.

### Top Energy Use Systems:

#1 SECONDARY TREATMENT	55.44%
#2 FIXED FILM TREATMENT	10.62%
#3 ANAEROBIC DIGESTION	4.70%
#4 LIGHTING	4.98%
#5 PRIMARY TREATMENT	3.82%
Balance of Plant Identified	8.51%
Balance of Plant Unidentified	11.93%

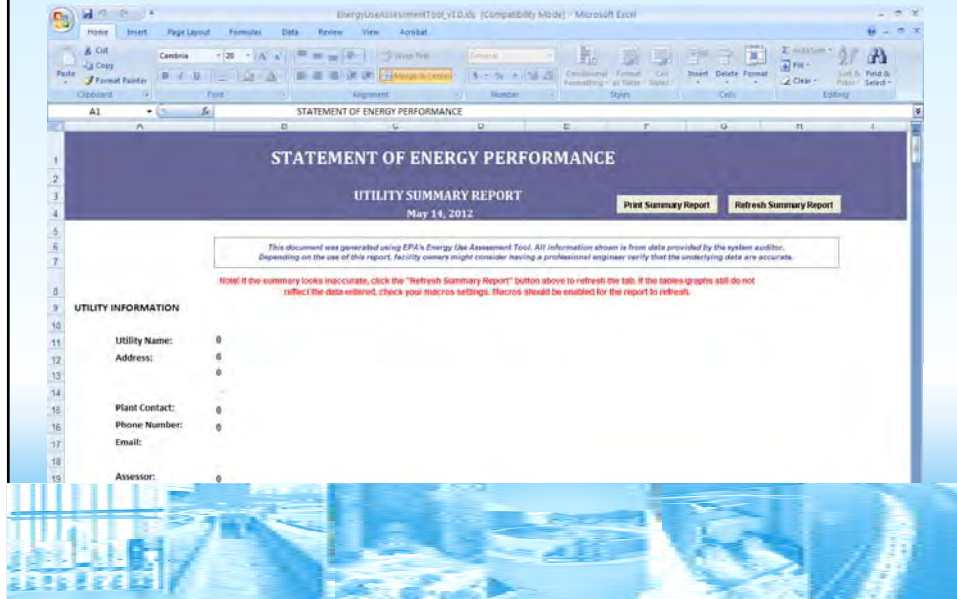
### Top Electrical Energy Use Systems



## Energy Use Assessment Tool

- Setup Instructions
- Instructions Tab
- General Information Tab
- Building Data Tab
- WTP / WWTP Energy Usage Tab
- **Summary Report Tab**
  - Action Buttons
  - Overview of Baseline Energy Use
  - Graphical Summaries for the Latest 12 Months
  - Distribution of Electrical energy Use and Cost by Major Process
  - Equipment Inventory
  - Energy Trends for Over the Last 5 years

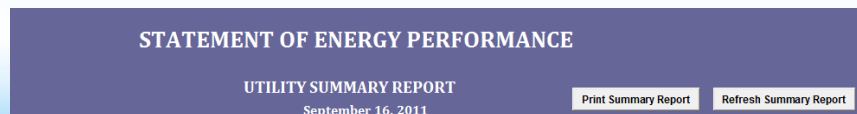
## Summary Reports Tab



## Summary Reports Tab: Action Buttons

The Summary Report tab contains a summary of all the information entered on the General Information, Building, and WTP/WWTP Energy Usage tabs.

- **Print Summary Report Button:** Prints the report base on the default print options in Excel.
- **Refresh Summary Report Button:** Use the Refresh Summary Report button to refresh the tables and charts on the tab.



## Summary Reports Tab: Overview of Baseline Energy Use

The Baseline Energy Use summarizes each utility's consumption and cost for the last 12 months entered on the General Information tab and the amount of water treated during that period.

TABULATED UTILITY USE, COST AND WATER TREATMENT FLOW SUMMARY FOR 2011  
(7/2010 - 6/2011)

Utility	Site Utility Use (Common Units)	Site Utility Costs	% of Costs
Electricity	2,248,000 kWh	\$227,497	42%
Natural Gas*	31,683 CCF	\$36,132	7%
No 2 Fuel Oil*	50,546 CCF	\$53,631	10%
Water & Sewer*	28,169,069 GAL	\$156,967	29%
Alternative Energy*	18,236,400 CCF	\$47,186	9%
Other - Propane*	18,618,000 GAL	\$21,296	4%
<b>Total</b>		<b>\$542,709</b>	<b>100%</b>

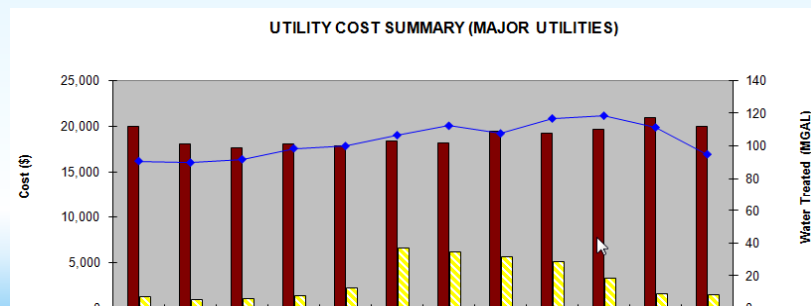
\* The values displayed for this category may be using data from previous months other than the above specified date ranges.



## Summary Reports Tab: Graphical Summaries for the Latest 12 Months

### ■ Utility Cost Summary Graph – Major Utilities

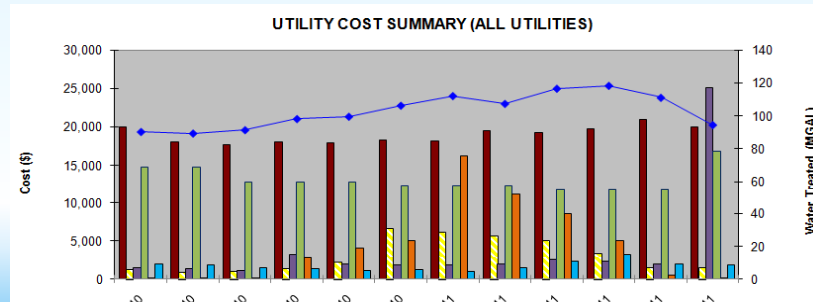
- The Utility Cost Summary graph shows monthly trends in the Cost for your system in bar graph form and compares that to the amount of Water Treated in line graph form.



## Summary Reports Tab: Graphical Summaries for the Latest 12 Months

### ■ Utility Cost Summary Graph – All Utilities

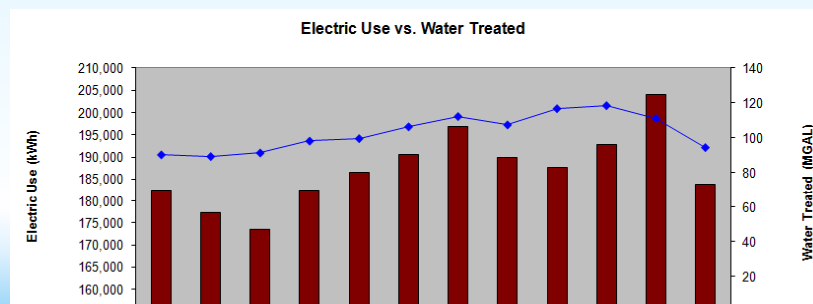
- The Utility Cost Summary graph (shows monthly trends in the Cost for your system in bar graph form and compares that to the amount of Water Treated in line graph form.



## Summary Reports Tab: Graphical Summaries for the Latest 12 Months

### ■ Electric Use vs. Water Treated Graph

- The Electric Use vs. Water Treated graph compares Electric Use (electric energy consumption) in bar graph form with Water Treated volumes in line graph form.

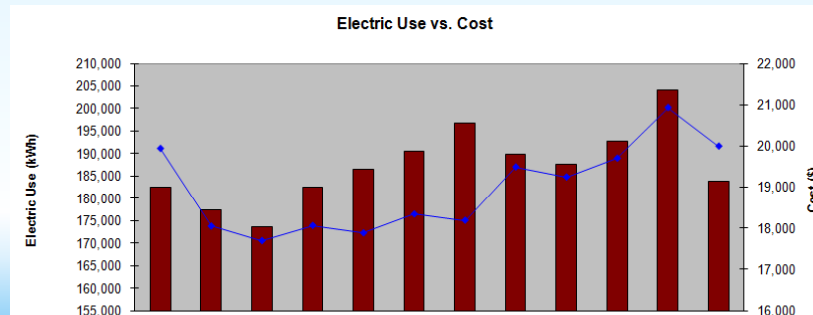




## Summary Reports Tab: Graphical Summaries for the Latest 12 Months

### ■ Electric Use vs. Cost Graph

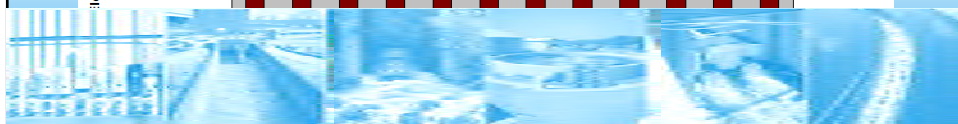
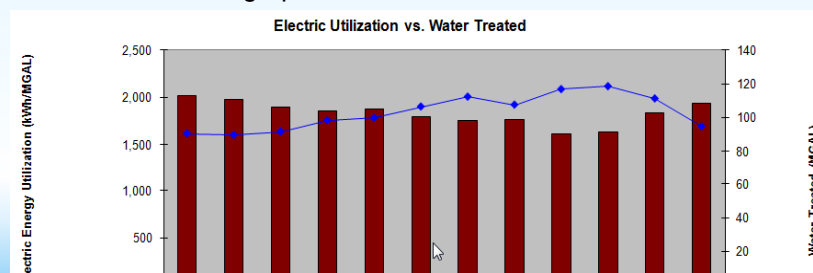
- The Electric Use vs. Cost graph shows the Electric Use in bar graph form as compared to Cost in line graph form.



## Summary Reports Tab: Graphical Summaries for the Latest 12 Months

### ■ Electric Utilization vs. Water Treated Graph

- The Electric Utilization vs. Water Treated graph shows the Electric Energy Utilization (energy consumption per amount of water treated) in bar graph form compared to the amount of Water Treated in line graph form



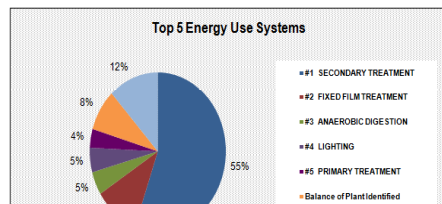


## Summary Reports Tab: Distribution of Electrical Energy Use and Cost by Major Process

### Summary Report

- The summary report generates a list of the Top 5 Electrical Energy Use Systems at the plant. That breakdown is listed by major system type.

DISTRIBUTION OF ELECTRICAL ENERGY USE & COST BY MAJOR PROCESS FOR 7/2010 - 6/2011



Major Process/Top Energy Use Systems	Electric Energy Use (%)	Electric Energy Use (kWh)	Electric Energy Cost (\$)
#1 SECONDARY TREATMENT	55.44%	1,246,334	\$126,129
#2 FIXED FILM TREATMENT	10.62%	238,639	\$24,150
#3 ANAEROBIC DIGESTION	4.70%	105,730	\$10,700
#4 LIGHTING	4.98%	111,865	\$11,321
#5 PRIMARY TREATMENT	3.82%	85,953	\$8,698
Balance of Plant Identified	8.51%	191,404	\$19,370
	11.93%	268,075	\$27,126

## Summary Reports Tab: Equipment Inventory

### Equipment Inventory

- A breakdown of the electrical energy use for all the equipment entered is shown in the summary report under the Equipment Inventory section.

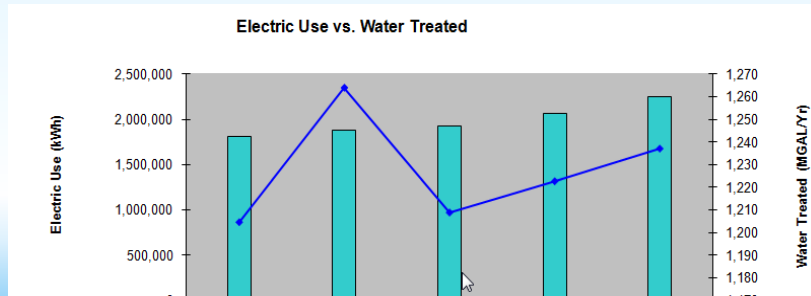
EQUIPMENT INVENTORY: BREAKDOWN OF ELECTRICAL ENERGY USE FOR MAJOR/ENERGY INTENSIVE EQUIPMENT

Major Process/Top Energy Use Systems	Motor Efficiency (%)	Efficiency Rating	Electric Energy Use (%)	Electric Energy Use (kWh)	Electric Energy Cost (\$)
Anaerobic Digestion					
Motor - Gas Heater	88	Medium	2.48%	55,696	\$5,636.40
Other kW Load - Mixer Heater	N/A	N/A	0.80%	18,000	\$1,821.80
Pump - Sludge Recirc Pump	85	Medium	1.43%	32,034	\$3,241.85
Effluent Pumping/Storage					
Pump - Effluent Pumps	91	High	0.91%	20,363	\$2,060.77
Fixed Film Treatment					
Pump - R Tower Pumps	91	High	10.62%	238,639	\$24,150.28
Influent Pumping					
Pump - Infl Pump Station	88	Medium	3.77%	84,667	\$8,568.27
Internal Plant Pumping					
Other kW Load	N/A	N/A	0.97%	21,900	\$2,216.28
Lighting					
Other kW Load - All Site Lighting	N/A	N/A	4.98%	111,865	\$11,320.75
Non Process HVAC					
Other kW Load - All Site HVAC	N/A	N/A	2.87%	64,474	\$6,524.72
Primary Treatment					
Blower - Channel Blower	88	Medium	2.14%	48,093	\$4,866.99
Blower - Grit Blowers	89	Medium	1.68%	37,861	\$3,831.49
Secondary Treatment					
Blower - Secondary Blowers	91	High	52.53%	1,180,931	\$119,509.12
Blower - Secondary Blowers	91	High	3.70%	80,664	\$8,139.17

## Summary Reports Tab: Energy Trends for Over the Last 5 Years

### ■ Electric Use vs. Water Treated Graph

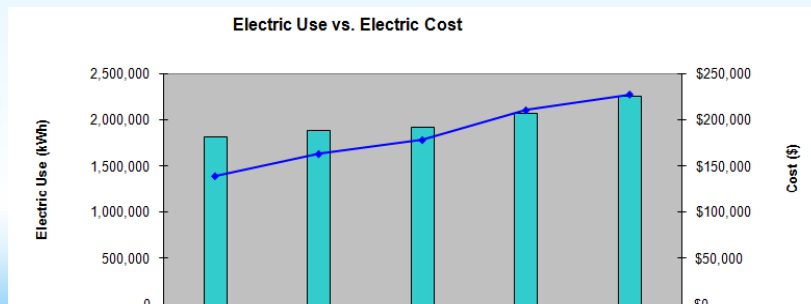
- The 5 Year Electric Use vs. Water Treated graph shows the annual Electric Use in bar graph form compared to the amount of Water Treated in line graph form.



## Summary Reports Tab: Energy Trends for Over the Last 5 Years

### ■ Electric Use vs. Cost Graph

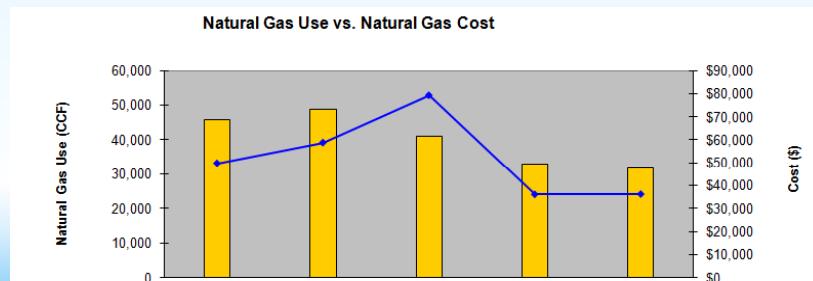
- The 5 Year Electric Use vs. Cost graph shows the annual Electric Use in bar graph form as compared to Cost in line graph form.



## Summary Reports Tab: Energy Trends for Over the Last 5 Years

### ■ Natural Gas Use vs. Cost Graph

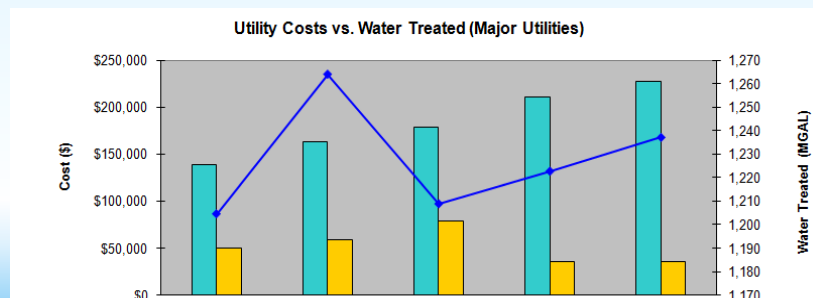
- The 5 Year Natural Gas Use vs. Cost graph shows the annual Natural Gas Use in bar graph form as compared to Cost in line graph form.



## Summary Reports Tab: Energy Trends for Over the Last 5 Years

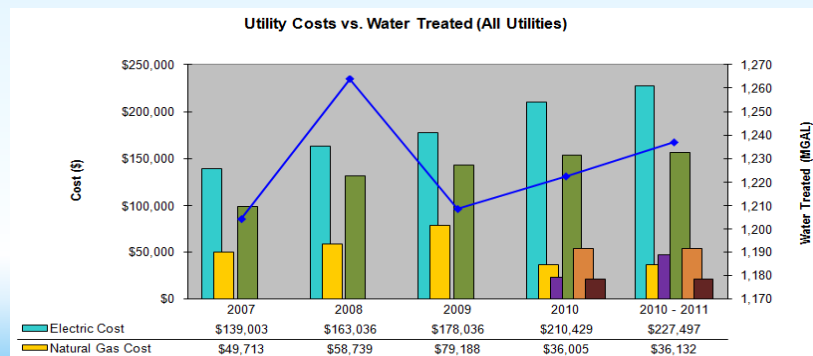
### ■ Utility Costs vs. Water Treated (Major Utilities) Graph

- The Utility Cost Summary graph shows annual trends in the Cost for your system in bar graph form and compares that to the amount of Water Treated in line graph form.



## Summary Reports Tab: Energy Trends for Over the Last 5 Years

- Utility Cost Summary Graph
  - Utility Costs vs. Water Treated (All Utilities)



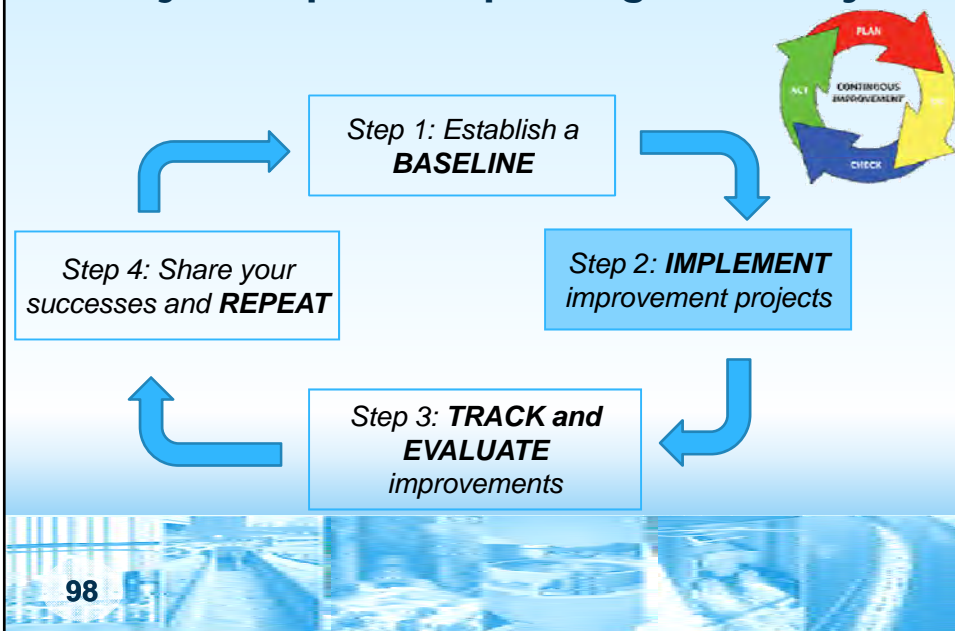
# Demo

## Agenda

- Why is energy use at water and wastewater systems important?
- What are the steps in an energy use assessment?
- How can the Energy Use Assessment Tool be used?
- **What are next steps?**



## Major Steps of Improving Efficiency





## Next Steps: Opportunities for Improvement

### 1. Prioritize further investigation of opportunities to reduce your energy use

- With energy evaluations the first goal is to find the “low hanging fruit.” These are the changes to your operations or equipment that are cheap and/or quick to implement.
- Look to make operational changes before capital changes.



## Next Steps: Opportunities for Improvement

### 2. Determine operational improvements to reduce energy use

- **Run time is a huge factor in the amount of energy and piece of equipment.**
  - Shut equipment down rather than leaving it idle.
  - Operate this equipment during non-peak electricity hours when the \$/kWh is lower.
  - Stagger equipment startup and number or large pieces running simultaneously to avoid costly demand charges.



## Next Steps: Opportunities for Improvement

### 3. Determine equipment improvements to reduce energy use

- What technology is being used currently vs new alternatives that are available?
- Do we need new equipment or can we retrofit existing equipment?
- Compare current technology and equipment to alternatives that are higher efficiency (what is the opportunity cost?)



## Next Steps: Opportunities for Improvement



Storage Pond and Storage Tank for Reclaimed Water  
Credit: West Melbourne, FL

### 3. Determine equipment improvements to reduce energy use (cont.)

- Gather capital and operating/maintenance cost for new equipment and compare that to your existing operating costs.
- Actual results may not fully reach their manufacturer's claimed efficiencies.



## Next Steps: Opportunities for Improvement

### 3. Determine equipment improvements to reduce energy use (cont.)

- Replacing equipment that runs constantly will generally pay back faster than intermittently used equipment.
- Remember that you can have two identical pumps but different motors.
- Once high energy use equipment is identified, then the efficiency readings for that equipment should be analyzed.



Storage Pond and Storage Tank for Reclaimed Water  
Credit: West Melbourne, FL



## Next Steps: Opportunities for Improvement

### 3. Determine equipment improvements to reduce energy use (cont.)

- Can you turn an existing waste into profit, like digester gas being burnt in your boilers or a micro turbine?
- Are there any local or federal programs that will assist in funding capital improvements that increase energy efficiency?
- Are your buildings and outdoor equipment properly insulated?



Composite Water Tower  
Credit: Chippewa Falls, WI



## Next Steps: Update the Tool & Seek Expertise

4. Compare and contrast impacts (reductions or increases) of contemplated equipment upgrades or technology changes
5. Update the tables to confirm energy impacts (reductions or increases) as operational or equipment modifications or replacements are completed
6. Seek detailed engineering insight

Overflow Valve  
Credit: Chippewa Falls, WI



## Next Steps: Tracking Trends & Upgrades

7. Utilize the Summary Report to:
  - Provide a focused snapshot of the past and current energy utilization at the plant each month.
  - Review trends to compare and contrast energy use and costs from month to month, season to season, and year to year.
8. Track site energy information to confirm use and cost impacts from operational and equipment improvements



Digester gas burn-off unit with sludge digester  
Credit: Galion, OH



# Questions?

Contact us at:

**[EnergyUseTool@epa.gov](mailto:EnergyUseTool@epa.gov)**

Download the Tool at:

**[http://water.epa.gov/infrastructure/sustain/energy\\_use.cfm](http://water.epa.gov/infrastructure/sustain/energy_use.cfm)**

**Like the Information in this Webinar?**

**Look for the *Energy Use Assessment pocket guide* coming out this summer!**

**[http://water.epa.gov/infrastructure/sustain/energy\\_use.cfm](http://water.epa.gov/infrastructure/sustain/energy_use.cfm)**



# Resources



## Energy Use Assessment Tool User's Guide Appendices

- Calculations
- Unit Definitions and Conversions
- Acronyms and Abbreviations
- Troubleshooting Guide
- Cheat Sheet

Download the Tool and User's Guide at:  
[http://water.epa.gov/infrastructure/sustain/energy\\_use.cfm](http://water.epa.gov/infrastructure/sustain/energy_use.cfm)

*Return Activated Sludge (RAS) Station and two associated Pad mounted Transformers (PMTs)*

*Credit: City of Lincoln, IL*



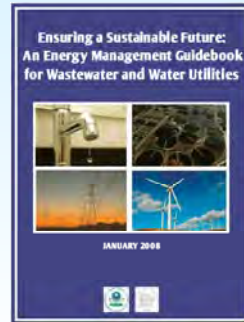
## Managing to Maximize Energy Efficiency

### Designed to help utilities:

- Systematically assess current energy costs and practices
- Set measurable performance improvement goals
- Monitor and measure progress over time

Uses a management system approach for energy conservation, based on the successful Plan-Do-Check-Act process [based on Environmental Management Systems (EMS)]

[http://water.epa.gov/infrastructure/sustain/cut\\_energy.cfm](http://water.epa.gov/infrastructure/sustain/cut_energy.cfm)



## Resources: Getting Through an Energy Audit

- **Resource: EPA's EnergyStar Portfolio Manager** is a free, on-line tool public water systems can use to develop a simple energy baseline based on utility bill data and track changes in energy use and GHG emissions over time [[www.energystar.gov/benchmark](http://www.energystar.gov/benchmark)]
- **RESOURCE: Understanding Your Electric Bill**  
[<http://water.epa.gov/infrastructure/sustain/upload/Understanding-Your-Electric-Bill.pdf>]
- **RESOURCE: Electric Power Research Institute (EPRI) Energy Audit Manual for Water /Wastewater Facilities**  
[<http://www.cee1.org/ind/mot-sys/ww/epri-audit.pdf> ]
- **RESOURCE: How to Hire an Energy Auditor**  
[[http://www.energy.ca.gov/reports/efficiency\\_handbooks/400-00-001C.PDF](http://www.energy.ca.gov/reports/efficiency_handbooks/400-00-001C.PDF)]



## Resources: Energy Action Plans and RFPs

- **RESOURCE: EPA's Ensuring a Sustainable Future: Energy Management Guidebook for Wastewater and Water Utilities** provides guidance to utilities to develop an effective and lasting energy management program  
[[http://www.epa.gov/waterinfrastructure/pdfs/guidebook\\_si\\_energy\\_management.pdf](http://www.epa.gov/waterinfrastructure/pdfs/guidebook_si_energy_management.pdf)]
- **RESOURCE: Consortium for Energy Efficiency RFP Guidance for Water-Wastewater Projects** provides recommendations and model language for solicitations for energy efficiency design services [<http://www.cee1.org/ind/mot-sys/ww/rfp/index.php3>]
- **RESOURCE: 5 Steps to Successful Energy Performance Contracting**  
[<http://www.energyservicescoalition.org/resources/5steps.htm>]



## Resources: Best Practices

- **RESOURCE: Water and Wastewater Energy Best Practice Guidebook**  
[<http://www.werf.org/AM/Template.cfm?Section=Home&TEMPLAT E=/CM/ContentDisplay.cfm&CONTENTID=10245>]
- **RESOURCE: NYSDERDA Water & Wastewater Energy Management Best Practices Handbook**  
[[http://www.nysderda.org/programs/Environment/best\\_practice\\_han dbook.pdf](http://www.nysderda.org/programs/Environment/best_practice_han dbook.pdf)]
- **RESOURCE: SAVING WATER & ENERGY IN SMALL WATER SYSTEMS** is a training program with four 45-minute presentations and associated resource files specific to small public water systems concerning water conservation, water audit and leak detection, energy efficiency and the application of alternative energy sources  
[<http://watercenter.montana.edu/training/savingwater/default.htm>]



## Resources: A Closer Look at Pumps

- **RESOURCE: Pump System Assessment Tool (PSAT)** is a free, on-line tool developed by the U.S. Department of Energy that helps users assess energy savings opportunities in existing pumping systems. It relies on field measurements of flow rate, head, and motor power or current to perform the assessment [[http://www1.eere.energy.gov/industry/bestpractices/software\\_psat.html](http://www1.eere.energy.gov/industry/bestpractices/software_psat.html)]. Table 2 provides a framework for evaluating a water utility's pump system efficiency.
- **RESOURCE: Pump System Improvement Modeling Tool (PSIM)** is a free educational tool focused on helping you better understand the hydraulic behavior of pumping systems [[http://www.pumpsystemsmatter.org/content\\_detail.aspx?id=110](http://www.pumpsystemsmatter.org/content_detail.aspx?id=110)]
- **RESOURCE: Improving Pump System Performance: A Sourcebook for Industry** [<http://www1.eere.energy.gov/industry/bestpractices/pdfs/pump.pdf>]

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## Resources: A Closer Look at Motors

- **RESOURCE: DOE factsheet Determining Electric Motor Load and Efficiency** [<http://www1.eere.energy.gov/industry/bestpractices/pdfs/10097517.pdf>]
- **RESOURCE: CEE Motor Systems Initiative Tool Kit** [<http://www.cee1.org/ind/mot-sys/mot-sys-tools.php3>]
- **RESOURCE: U.S. DOE Motor Challenges Program** provides downloadable books, tips, and fact sheets on technical and economic topics related to motors [[http://www1.eere.energy.gov/industry/bestpractices/techpubs\\_motors.html](http://www1.eere.energy.gov/industry/bestpractices/techpubs_motors.html)]
- **RESOURCE: Consortium for Energy Efficiency Motors and Motor Systems Industrial Program** provides technical material, links, and fact sheets under its [<http://www.cee1.org/ind/mot-sys/mtr-ms-main.php3>]

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## Resources: Water Efficiency

- **RESOURCE: U.S. EPA WaterSense** is a program that sets criteria for labeling water efficient products and promoting water conservation to customers. It also allows water systems to become partners to promote WaterSense and water efficiency. Benefits to being a partner include gaining access to templates and other WaterSense-developed materials [<http://www.epa.gov/watersense>]
- **RESOURCE: American Water Works Association's (AWWA) Water Audit Software** is a free, on-line tool for water systems that want to conduct a standard water audit that can be downloaded on AWWA's website [<http://www.awwa.org/Resources/WaterLossControl.cfm?ItemNumber=48511&navItemNumber=48158>]



## Resources: Green Energy

- **RESOURCE: U.S. EPA Green Power Partnerships** [<http://www.epa.gov/greenpower>]
- **RESOURCE: U.S. DOE Energy Efficiency and Renewable Energy Clearinghouse** [<http://www.eere.energy.gov>]
- **RESOURCE: SAVING WATER & ENERGY IN SMALL WATER SYSTEMS** is a training program with four 45-minute presentations and associated resource files specific to small public water systems concerning water conservation, water audit and leak detection, energy efficiency and the application of alternative energy sources. [<http://watercenter.montana.edu/training/savingwater/default.htm>]





## Resources: Funding

- **RESOURCE: DWSRF Green Project Reserve Guidance**  
[<http://www.epa.state.il.us/water/financial-assistance/publications/green-project-reserve-guidance.pdf>]
- **RESOURCE: DWSRF Contacts by State**  
[<http://www.epa.gov/ogwdw/dwsrf/nims/dwagency2.pdf>]
- **RESOURCE: Database of State Incentives for Renewables & Efficiency (DSIRE)** is a comprehensive source of information on state, local, utility, and federal incentives and policies that promote renewable energy and energy efficiency [<http://www.dsireusa.org/>]
- **RESOURCE: Federal Energy Management Program (FEMP)** provides information on energy efficiency and renewable energy incentives, state-by-state  
[<http://www1.eere.energy.gov/femp/financing/energyincentiveprograms.html>]



## Resources: Funding

- **RESOURCE: U.S. Department of Energy**
  - **Save Energy Now Program** is an initiative to reduce industrial energy intensity. Companies can participate in no-cost energy assessments.  
[<http://www1.eere.energy.gov/industry/saveenergynow/assessments.html>]
  - **Energy Efficiency and Conservation Block Grant Program (EECBG)**  
[<http://www.eecbg.energy.gov/>]
- **RESOURCE: U.S. Department of Agriculture (USDA)**
  - **Rural Energy for America Program Grants/Energy Audit and Renewable Energy Development Assist (REAP/EA/REDA)** provides grants for energy audits and renewable energy development assistance.  
[<http://www.rurdev.usda.gov/rbs/busp/REAPEA.htm>]
  - **Rural Development through the Rural Energy for America Program Guaranteed Loan Program (REAP LOAN)** provides financing for energy improvement projects  
[<http://www.rurdev.usda.gov/rbs/busp/9006loan.htm>]
- **RESOURCE: U.S. Department of Health and Human Services - Rural Assistance Center (RAC)** offers funding to help rural communities, including funds for energy audits and renewable energy [<http://www.raconline.org/funding/>]

